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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/650,258	08/27/2003	Han-Ping Pu	6319-66761	7182
24504	7590	09/30/2005		
THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP 100 GALLERIA PARKWAY, NW STE 1750 ATLANTA, GA 30339-5948			EXAMINER NGUYEN, DILINH P	
			ART UNIT	PAPER NUMBER
			2814	

DATE MAILED: 09/30/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/650,258

Applicant(s)

PU, HAN-PING

Examiner

DiLinh Nguyen

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 18 July 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 12-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 12-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

2. Claims 12-14, 18 and 20 are rejected under 35 U.S.C. 102(e) as being anticipated by Grigg (U.S. Pat. 6506671).

Grigg discloses an electronic package comprising:

a device carrier 30 including a metal surface 32;

at least a semiconductor unit 10 including at least an electrode 12; and

at least an interconnection portion including a first part 50' and a second part 20',

wherein the second part directly contacts the metal surface and the semiconductor unit, both the first part and second part span between and tie together the metal surface and the semiconductor unit, the second part is wrapped by the first part, the first part has a melting point lower than that of the second part, and the first part adheres to the second part (cover fig., column 5, lines 36 et seq.).

- Regarding claim 13, Grigg discloses that the interconnection portion electrically connects the metal surface and the semiconductor unit (cover fig., column 5, lines 64-65).

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- Regarding claim 14, Grigg discloses that the interconnection portion mechanically connects the device carrier 30 and the semiconductor unit 10 (cover fig.).
- Regarding claim 18, Grigg discloses that the second part is sealed by the first part, the device carrier 30 and the semiconductor unit 10 (cover fig.).
- Regarding claim 20, Grigg discloses that the first part has an end partially contacting the electrode of the semiconductor unit and partially contacting an area which is part of the semiconductor unit and which surrounds the electrode of the semiconductor unit (cover fig.).

3. Claims 12-14 and 18-19 are rejected under 35 U.S.C. 102(e) as being anticipated by Lin (U.S. Pat. 6369451).

Lin discloses an electronic package comprising:

a device carrier 210' including a metal surface;

at least a semiconductor unit 220' including at least an electrode; and

at least an interconnection portion including a first part and a second part,

wherein the second part directly contacts the metal surface and the semiconductor unit, both the first part and second part span between and tie together the metal surface and the semiconductor unit, the second part is wrapped by the first part, the first part has a melting point lower than that of the second part, and the first part adheres to the second part (fig. 3C, column 5, lines 1-15).

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- Regarding claim 13, Lin discloses that the interconnection portion electrically connects the metal surface and the semiconductor unit (fig. 3C, column 5, lines 1-15).
- Regarding claim 14, Lin discloses that the interconnection portion mechanically connects the device carrier 210' and the semiconductor unit 220' (fig. 3C).
- Regarding claim 18, Lin discloses that the second part is sealed by the first part, the device carrier 210' and the semiconductor unit 220' (fig. 3C).
- Regarding claim 19, Lin et al. discloses that the first part contains materials by which the solder wettability between the first part and the second part is controlled by the second part (fig. 3C).

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 15 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grigg (U.S. Pat. 6506671) in view of Lin et al. (U.S. Pat. 6369451).

Grigg substantially discloses all the limitations as claimed above. Grigg also discloses the second part (solder ball) contains more lead than tin (column 1, lines 37-41). Grigg does not disclose the first part contains more tin than lead.

However, Lin et al. disclose an electronic package comprising: at least an interconnection portion including a first part and a second part, the first part has a

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melting point lower than that of the second part, and the first part adheres to the second part; and wherein the first part contains more tin than lead (fig. 3C, column 5, lines 6-7). Therefore, it would have been obvious to one having ordinary in the art at the time the invention was made to modify the device structure of Grigg et al. by having the first part contains more tin than lead, as taught by Lin et al., in order to provide the interconnection portions with unchanged in their original shapes (column 5, lines 12-13).

- Regarding claim 19, Lin et al. discloses that the first part contains materials by which the solder wettability between the first part and the second part is controlled by the second part (fig. 3C).

6. Claims 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grigg (U.S. Pat. 6506671) in view of Applicant Admitted Prior Art (fig. 1a).

Grigg substantially discloses all the limitations as claimed above except for the device carrier is a lead frame.

However, AAPA (fig. 1a) discloses an electronic package comprising: a device carrier 101 including a metal surface 82; wherein the device carrier is a lead frame 101 enclosed by the metal surface 82. Therefore, it would have been obvious to one having ordinary in the art at the time the invention was made to modify the device structure of Grigg by having the device carrier is a lead frame, as taught by AAPA (fig. 1a), in order to improve an efficiency and design flexibility in mounting the semiconductor package device (fig. 1a).

7. Claims 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin (U.S. Pat. 6369451) in view of Applicant Admitted Prior Art (fig. 1a).

Lin substantially discloses all the limitations as claimed above except for the device carrier is a lead frame.

However, AAPA (fig. 1a) discloses an electronic package comprising: a device carrier 101 including a metal surface 82; wherein the device carrier is a lead frame 101 enclosed by the metal surface 82. Therefore, it would have been obvious to one having ordinary in the art at the time the invention was made to modify the device structure of Lin by having the device carrier is a lead frame, as taught by AAPA (fig. 1a), in order to improve an efficiency and design flexibility in mounting the semiconductor package device (fig. 1a).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DiLinh Nguyen whose telephone number is (571) 272-1712. The examiner can normally be reached on 8:00AM - 6:00PM (M-F).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DLN

  
HOAI PHAM  
PRIMARY EXAMINER